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DELINEATION OF SOIL TEMPERATURE  
REGIMES FROM HCMM DATA

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#### A. Objectives of Contract

An investigation is proposed in which remotely sensed data from the HCMM and Landsat satellites will be evaluated as input into the National Cooperative Soil Survey. The objectives of the project are to:

- 1) determine the feasibility of using HCMM and ancillary data to measure soil surface and plant canopy temperatures and to thereby delineate and map soils into their respective soil temperature regimes; and
- 2) develop and evaluate techniques for using HCMM and HCMM-Landsat merged data for input to the National Cooperative Soil Survey.

#### B. Activities During Reporting Period

- 1) Supplementary data (i.e., aerial photos, topographic maps, geologic maps, soils maps) were obtained and evaluated for ground truth purposes and control point selection.
- 2) A study area (approx. 450 x 450 pixels) was subset from a 13 May 76 Landsat scene (scene No. 2477-17142). Geometric corrections and scaling were performed. Initial enhancement techniques have begun to aid in control point selection and soils interpretations. Signature classification remains in its early stages.
- 3) SUBSET program has been modified to read HCMM tapes. HCMM data was reformatted so that it was compatible with the ORSER System. Initial NMAP products of geometrically corrected and scaled raw data tapes (unregistered) of the study area have been produced.

#### C. Planned Activity

- 1) Test various techniques to display spatial distribution of HCMM data and relate to soil conditions of the study area.
- 2) Incorporate digital terrain data to evaluate temperature change as related to elevation changes and also to isolate soils occurring at similar elevations. Surface features unique to elevation intervals may be isolated automatically. Also, additional factors such as slope and aspect may be calculated and evaluated.
- 3) Merge HCMM and Landsat data through a common 1:24,000 base map. Classification comparisons will be made between Landsat data and Landsat data merged with HCMM data. Techniques will be developed to quantitatively evaluate the differences between these two data sets.

- 4) Field work to evaluate imagery products and interpretations. Supervised classification techniques may require field work for accurate category selection.

D. Potential Problem Areas

- 1) Data acquisition remains the largest obstacle to project development. Registered products of the primary data set (12 May 78) are yet to arrive. Accurate registration of raw data tapes would slow progress. The majority of data did not arrive until September.
- 2) Resolution differences between HCMM and Landsat data may create registration problems during data merger. Techniques will need to be developed to evaluate accuracy of registration.

E. Costs Accrued To Date

Katherine Marinakos (Secretary), Nanna Bolling (Image Analyst) and George Baumer (Systems Analyst) are presently funded on this project. Rick Day (Graduate Assistant) has been supported by departmental teaching funds. Approximately \$737 have been expended for supplies and materials.